



Track & Trackside Materials

voestalpine Railway Systems



From Nanometres to Networks: A Holistic Vision for Railway Infrastructure

As global railway networks face unprecedented demands and shrinking maintenance windows, simply supplying better track components is no longer enough, explains Albert Jörg, Senior Vice President Railway Systems and Product Solutions voestalpine Railway Systems.

The modern railway is a paradox. It's a system under constant pressure – from rising traffic demand and ever-shrinking maintenance windows to relentless budget constraints and the known shortage of engineers across the engineering sector. At the same time, it's a system that's expected to deliver unprecedented levels of safety, availability and efficiency. Analysing how best to deliver in this challenging environment helped voestalpine Railway Systems recognise a fundamental truth – simply supplying better individual components is no longer enough.

We've therefore deliberately repositioned ourselves from a component supplier to a true systems provider. But possessing a large portfolio of products is not the same as being a genuine system house. The real shift is a philosophical one – a steadfast commitment

to thinking bigger, broader and deeper to build better, more resilient track and special trackwork.

Thinking Across the Full Scale of Rail

This isn't just a theoretical exercise; it's the physical reality of railway engineering. The planning and construction of a new line can take decades; with the strategic decisions we make today profoundly influencing asset performance forty years into the future. At the other extreme, the critical physical interactions in the wheel-rail contact – the immense stresses, strains and temperature spikes that ultimately determine wear and tear – happen in mere milliseconds.

This same radical shift in scale applies to distance. We must consider everything from the hundreds of kilometres of a network's alignment down to the nanometres of a material's microstructure. Understanding the physical processes at this micro-level – how loads are transferred, the forces acting on sleepers and ballast – feeds directly back into our macro-level infrastructure planning. It forms a continuous, vital feedback loop. This allows us to prepare robust solutions for future applications and, just as importantly, to advise planners on what's beneficial for the system as a whole, rather than just a single stretch of track.

A Framework for Value

voestalpine Railway Systems' philosophy is built squarely on four pillars: safety, financial viability, environmental sustainability and systems availability. Whenever we approach a new project, the hierarchy of these pillars remains crystal clear.

This safety-first mindset is absolutely non-negotiable. However, the other three pillars represent a constant

balancing act, a series of complex trade-offs informed by tight budgets, specific operational contexts and long-term strategic goals. Finding the overall optimum in financial viability (investment vs. life-cycle-costing), sustainability or availability, depending on the client's immediate needs is a core activity, but in safety, there's zero room for compromise.

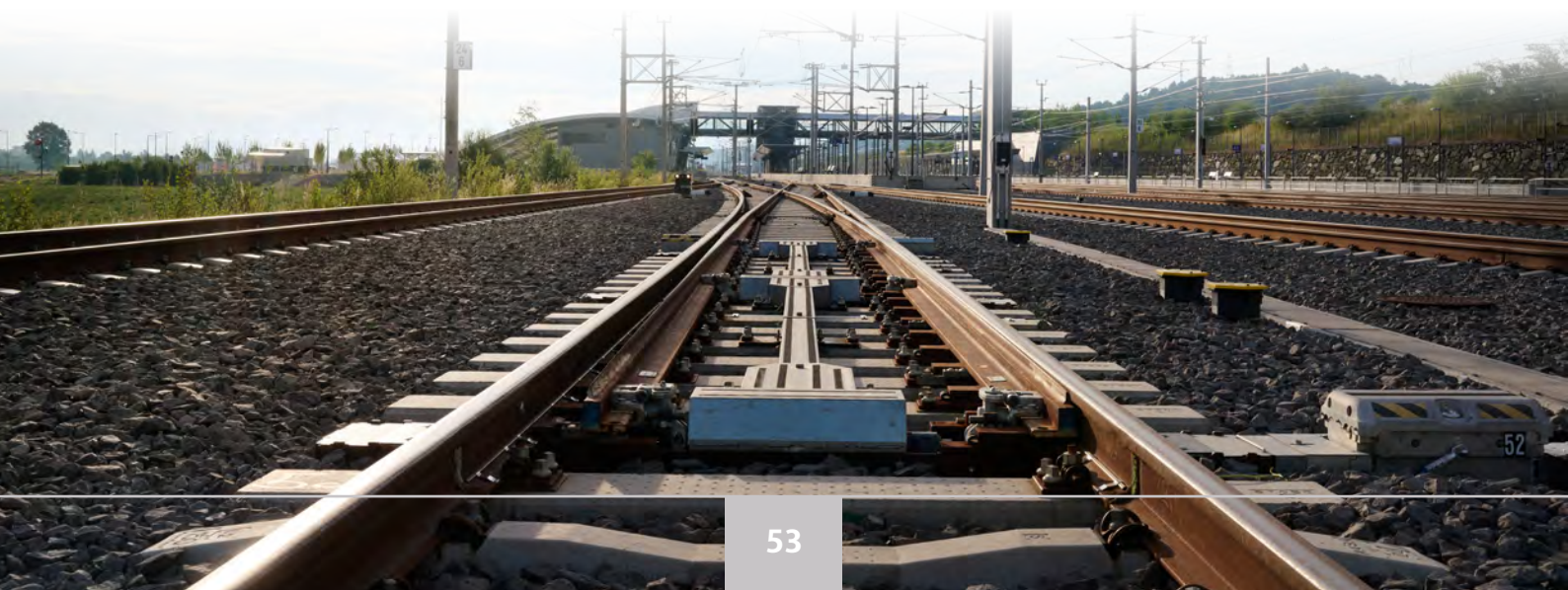
This framework provides us with a clear set of values, guiding every engineering and commercial decision towards delivering a solution that's not just technically sound, but holistically optimised for our customer's daily reality.

What It Means to Be a Systems Provider

The railway is an incredibly complex, interconnected system. Trying to make an isolated optimisation might improve the specific component you're looking at, but it might not have the same positive impact on the entire network. In fact, more often than not, it simply shifts the problem to another area, accelerating wear elsewhere.

This realisation is the central tenet of our systems provider approach. Instead of focusing on a single part in isolation, we combine the knowledge and experience of all our varied disciplines to find the absolute optimum at the system level. This means extending our boundaries beyond our traditional remit to understand what's happening at the operator and even the passenger level. It transforms the commercial dynamic from a simple, transactional client-supplier relationship into a deep, collaborative partnership.

We leverage the collective intelligence within the entire voestalpine group and work hand-in-hand with the customer to define the exact measures



that will tackle the root of a problem and optimise the entire system simultaneously. This approach directly mitigates the significant operational risk of rapid degradation, which inevitably occurs when a component, no matter how impeccably manufactured, doesn't harmonise with the system it's placed within.

Embedding the System Mindset

Possessing the extensive portfolio required to become a system provider is one thing; executing on that promise is another entirely. voestalpine Railway Systems' transformation wasn't overnight, but rather an organic evolution. It was a rigorous process that required a clear, unwavering vision from top management and the enthusiastic buy-in of our teams around the world.

Acquiring companies and expanding a portfolio doesn't automatically create a system approach. That's when the real work starts. Bringing together the brilliant minds involved across a large global group to create a unified system approach required a conscious, dedicated effort to break down ingrained internal silos and foster a culture of holistic thinking.

Delivering Relief for Operators

The result is an organisation that has become a true system house. This shared DNA is now so deeply embedded in our corporate culture that even when we sell a single component, it carries our system mindset with it. Every product we produce is developed and engineered with a profound understanding of its role in the wider infrastructure, its future maintainability

and its long-term operational robustness.

The primary benefit of our system solution is the active prevention of rapid, costly deterioration. By ensuring all elements work in concert, from the advanced material science of the rail profile to the complex, dynamic behaviour of the rolling stock, our system provider approach builds in resilience and longevity from day one.

This proactive, integrated optimisation directly leads to greater system availability, significantly reduced downtime and far more predictable maintenance schedules, giving operators the financial stability and operational performance they need to keep the world moving.

A Glimpse of the Future at InnoTrans 2026

This guiding philosophy will be on full display at InnoTrans 2026. Visitors to the voestalpine Railway Systems stand can expect to see not just exciting, cutting-edge developments at the individual component level, unique digital solutions but also clear, tangible demonstrations of how these innovations are seamlessly integrated into our overarching systems approach.

It serves as the perfect illustration that cutting-edge component technology and a holistic system mindset create railway infrastructure that is far greater than the sum of its parts. For us, InnoTrans is not just an exhibition, it's the ultimate proof point for a thesis we are proving every single day on tracks around the world.

Meet voestalpine Railway Systems at InnoTrans on Booth 150, Hall 21b.



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